CLAIMS

1. Shrink film for wrapping foodstuffs, comprising:
   - a plurality of overlaid layers constituted by non-crosslinked thermoplastic polymers of different natures, wherein the material that constitutes one of the outer layers melts at a lower temperature than the materials that constitute the other layers;
   - three layers constituted by polymers having a Young's modulus substantially higher than that of the polymers which constitute the other layers;

   characterised in that:
   - one of said three layers with a higher Young's modulus is on the outside of the film, whereas the other two layers with a higher Young's modulus are on the inside of the film;
   - each of said three layers with a higher Young's modulus is separated from the other layers with a higher Young's modulus by at least one layer with a lower Young's modulus.
2. Film as claimed in claim 1, characterised in that said three layers with a higher Young's modulus are highly impermeable to gases, especially oxygen and aqueous steam.
3. Film as claimed in claim 1, characterised in that said two layers with a higher Young's modulus which are situated inside the film are located on the opposite side, in relation to the neutral plane of the film, from the layer with a higher Young's modulus which lies on the outside of the film.
4. Film as claimed in claim 3, characterised in that the sequence of all the layers constituting said film, and their thickness, from which the distance of each of said layers from the neutral plane of said film derives, are determined in such

a way that the sum of the moments exerted by said layers in relation to said neutral plane after the process of biaxial orientation is substantially nil, wherein:

- the moment exerted by a single layer in relation to the neutral plane is equal to the product of the membrane force exerted by said layer and the distance of the average plane of said layer from the neutral plane of the film;
- the membrane force exerted by said layer is equal to the product of the Young's modulus of the material which constitutes said layer, the thickness of said layer and the prevented shrinkage, expressed as a percentage.

5. Film as claimed in claims 1 to 3, characterised in that the layers with a higher Young's modulus are constituted by polymers of the polyamide family.

6. Film as claimed in claims 1 to 5, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the internal part of the wrapping, and can be constituted by ionomers containing zinc or sodium, a low-density polyethylene or linear low-density polyethylene (LDPE/LLDPE), or an ethylene or octene plastomer;
- layer B, thickness 5 to 15%, first adhesive layer – consists of an adhesive polymer selected from among terionomers, or ethylene modified with maleic anhydride copolymers, or an EVA/ethylene methacrylic acid copolymer;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among PA 6, PA 6/66,

amorphous or aliphatic PA or a mixture thereof, possibly with the addition of terionomers;

- layer D, thickness 10 to 20%, second adhesive layer – consists of an adhesive polymer selected from among terionomers, or ethylene modified with maleic anhydride copolymers, or of an EVA/ethylene methacrylic acid copolymer, and may be equal to or different from layer B;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among PA 6, PA 6/66, amorphous or aliphatic PA or a mixture thereof, possibly with the addition of terionomers, and may be equal to or different from layer C, alternatively, PVA or PGA can be used;
- layer F, thickness 5 to 15%, third adhesive layer – consists of an adhesive polymer selected from among terionomers, or ethylene modified with maleic anhydride copolymers, or of an EVA/ethylene methacrylic acid copolymer, and may be equal to or different from layers B and D;
- layer G, thickness 5 to 25%, outer layer and fourth barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among PA 6 or PA 6/66.

7. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 5 to 10%, first adhesive layer – consists of a terionomer;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam)

– consists of a polyamide polymer selected from among polyamides PA 6/66;

- layer D, thickness 10 to 20%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 5 to 15%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

8. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 5 to 15%, first adhesive layer – consists of a terionomer;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 and aliphatic PA;
- layer D, thickness 10 to 20%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 5 to 15%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to

aqueous steam) – consists of a polyamide polymer PA 6/66.

9. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 5 to 15%, first adhesive layer – consists of a terionomer;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA blended with a terionomer;
- layer D, thickness 10 to 20%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 5 to 15%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

10. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 5 to 15%, first adhesive layer – consists of a terionomer;

- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 10 to 20%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA;
- layer F, thickness 5 to 15%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

11. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 5 to 15%, first adhesive layer – consists of a terionomer;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 10 to 20%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA blended with a terionomer;

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- layer F, thickness 5 to 15%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

12. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 5 to 15%, first adhesive layer – consists of a terionomer;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 10 to 20%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of an aliphatic PA polymer;
- layer F, thickness 5 to 15%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

13. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of

the wrapping, and is constituted by an ethylene or octene plastomer

- layer B, thickness 5 to 15%, first adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA;
- layer D, thickness 10 to 20%, second adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 5 to 15%, third adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

14. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by LLDPE;
- layer B, thickness 5 to 15%, first adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA;
- layer D, thickness 10 to 20%, second adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;

- layer F, thickness 5 to 15%, third adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

15. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by LDPE;
- layer B, thickness 5 to 15%, first adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + PA 6;
- layer D, thickness 10 to 20%, second adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 5 to 15%, third adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

16. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;

- layer B, thickness 5 to 15%, first adhesive layer – consists of a terionomer;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 10 to 20%, second adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous steam) – consists of PVA (polyvinyl alcohol);
- layer F, thickness 5 to 15%, third adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

17. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 10 to 30%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 5 to 15%, first adhesive layer – consists of a terionomer;
- layer C, thickness 10 to 20%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 10 to 20%, second adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer E, thickness 10 to 20%, second barrier layer (mainly to aqueous

steam) – consists of PGA (polyglycolic acid);

- layer F, thickness 5 to 15%, third adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer G, thickness 5 to 25%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

18. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and can be constituted by ionomers containing zinc or sodium, a low-density polyethylene or linear low-density polyethylene (LDPE/LLDPE), or an ethylene or octene plastomer;
- layer B, thickness 10%, first adhesive layer – consists of an adhesive polymer selected from among ethylene copolymers or terionomers modified with maleic anhydride, or of an EVA/ethylene methacrylic acid copolymer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among PA 6, PA 6/66, amorphous or aliphatic PA or a mixture thereof, possibly with the addition of terionomers;
- layer D, thickness 15%, second adhesive layer – consists of an adhesive polymer selected from among terionomers, or ethylene modified with maleic anhydride copolymers, or of an EVA/ethylene methacrylic acid copolymer, and may be equal to or different from layer B;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among PA 6, PA 6/66,

amorphous or aliphatic PA or a mixture thereof, possibly with the addition of terionomers, and may be equal to or different from layer C; alternatively, PVA (polyvinyl alcohol) or PGA (polyglycolic acid) can be used;

- layer F, thickness 10%, third adhesive layer – consists of an adhesive polymer selected from among terionomers, or ethylene modified with maleic anhydride copolymers, or of an EVA/ethylene methacrylic acid copolymer, and may be equal to or different from layers B and D;
- layer G, thickness 15%, outer layer and fourth barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among PA 6 and PA 6/66.

19. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 10%, first adhesive layer – consists of a terionomer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 15%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 10%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;

- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

20. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 10%, first adhesive layer – consists of a terionomer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + aliphatic PA;
- layer D, thickness 15%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 10%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

21. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 10%, first adhesive layer – consists of a terionomer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA blended

with a terionomer;

- layer D, thickness 15%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 10%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

22. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 10%, first adhesive layer – consists of a terionomer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 15%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA;
- layer F, thickness 10%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

23. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 10%, first adhesive layer – consists of a terionomer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 15%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA blended with a terionomer;
- layer F, thickness 10%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

24. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 10%, first adhesive layer – consists of a terionomer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA

6/66;

- layer D, thickness 15%, second adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of an aliphatic PA polymer;
- layer F, thickness 10%, third adhesive layer – consists of an adhesive polymer selected from among the terionomers;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

25. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by an ethylene or octene plastomer;
- layer B, thickness 10%, first adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA;
- layer D, thickness 15%, second adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 10%, third adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

26. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by LLDPE;
- layer B, thickness 10%, first adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + amorphous PA;
- layer D, thickness 15%, second adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 10%, third adhesive layer – consists of LLDPE modified with maleic anhydride;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

27. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by LDPE;
- layer B, thickness 10%, first adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a mixture of polyamides PA 6/66 + PA 6;

- layer D, thickness 15%, second adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66;
- layer F, thickness 10%, third adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

28. Film as claimed in claim 6, characterised in that it comprises seven layers (A, B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 10%, first adhesive layer – consists of a terionomer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 15%, second adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of PVA (polyvinyl alcohol);
- layer F, thickness 10%, third adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

29. Film as claimed in claim 6, characterised in that it comprises seven layers (A,

B, C, D, E, F and G), starting from the layer in contact with the product, composed as follows:

- layer A, thickness 20%, welding layer – constitutes the inner part of the wrapping, and is constituted by ionomers containing zinc or sodium;
- layer B, thickness 10%, first adhesive layer – consists of a terionomer;
- layer C, thickness 15%, first barrier layer (mainly to aqueous steam) – consists of a polyamide polymer selected from among polyamides PA 6/66;
- layer D, thickness 15%, second adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer E, thickness 15%, second barrier layer (mainly to aqueous steam) – consists of PGA (polyglycolic acid);
- layer F, thickness 10%, third adhesive layer – consists of an EVA/ethylene methacrylic acid copolymer;
- layer G, thickness 15%, outer layer and third barrier layer (mainly to aqueous steam) – consists of a polyamide polymer PA 6/66.

POLYMER	PRODUCER	DENOMINATION
PA 6	BASF	B 35 F, B 4
PA 6	UBE	1022 C 2
PA 6/66	BASF	C 35 F
PA 6/66	UBE	FDX 17, FDX 27
Amorphous PA	Dupont	Selar PA 3426
Aliphatic PA	Mitsubishi	MXD 6
PVA	Idroplast	Plyvinilalcol
PGA	Kurea	Polyglycolic acido
Ionomers	Dupont	Surlyn 1705, 1650, 1601
Terionomers	Dupont	Surlyn 1857, 1801, 1901
EVA	Dupont	Elvax 3135 X
EVA	Exxon	UL 00909
Ethylene methacrylic acid copolymer	Dupont	Nucrel 1202 HC
Ethylene acrylic acid copolymer	DOW	Primacor 1410, 1321, 1420
Plastomeri etilene - ottene	DOW	Affiniti serie PL
Ethylene - octhene plastomers	Exxon	Serie EXAT
LLDPE modified with maleic anhyidride	Dupont	Bynel serie 4000, serie 4100, serie 4200
LLDPE	DSM	Stamylex 08-026 F, 1026 F, 1046 F, 09-046 F
LLDPE	DOW	Dowlex 2047, 2045, 2602 T
LDPE	DOW	562 R
LDPE	DSM	Stamylan 2102 T, 2402 T, 2602 T

Table 1

Layers	% Nom.	Change %	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Example 7	Example 8	Example 9	Example 10	Example 11
A	20	±1 0	Ionomer	Ionomer	Ionomer	Ionomer	Ionomer	Ionomer	Plastomer	LLDPE	LDPE	Ionomer	Ionomer
B	10	± 5	Terionomer	Terionomer	Terionomer	Terionomer	Terionomer	Terionomer	Modified LLDPE	Modified LLDPE	EVA + ethylene methacrylic acid copolymer	Terionomer	Terionomer
C	15	± 5	PA 6/66	PA 6/66 + aliphatic PA	PA 6/66 + amorphous PA + Terionomer	PA 6/66	PA 6/66	PA 6/66	PA 6/66 + amorphous PA	PA 6/66 + amorphous PA	PA 6/66 + PA 6	PA 6/66	PA 6/66
D	15	± 5	Terionomer	Terionomer	Terionomer	Terionomer	Terionomer	Terionomer	Modified LLDPE	Modified LLDPE	EVA + ethylene methacrylic acid copolymer	EVA + ethylene methacrylic acid copolymer	EVA + ethylene methacrylic acid copolymer
E	15	± 5	PA 6/66	PA 6/66	PA 6/66	PA 6/66 + amorphous PA	PA 6/66 + amorphous PA + Terionomer	Aliphatic PA	PA 6/66	PA 6/66	PA 6/66	PVA Polyvinylalcohol	PGA Polyglycolic acid
F	10	± 5	Terionomer	Terionomer	Terionomer	Terionomer	Terionomer	Terionomer	Modified LLDPE	Modified LLDPE	EVA + ethylene methacrylic acid copolymer	EVA + ethylene methacrylic acid copolymer	EVA + ethylene methacrylic acid copolymer
G	15	± 10	PA 6/66	PA 6/66	PA 6/66	PA 6/66	PA 6/66	PA 6/66	PA 6	PA 6/66	PA 6/66	PA 6/66	PA 6/66

Table 2

Characteristic to compare	Unit	Test method (ASTM)	Tipo BB	Example 1	Example 2	Example 3	Example 4	Example 5	Example 6	Example 7	Example 8	Example 9	Example 10	Example 11
	Test direction		MD/TD	MD/TD	MD/TD	MD/TD	MD/TD	MD/TD	MD/TD	MD/TD	MD/TD	MD/TD	MD/TD	MD/TD
Thickness	µm	//	60	60	60	60	60	60	60	60	60	60	60	60
Ultimate load	Mpa	D 822	60-65	110-128	110-128	110-128	110-128	110-128	110-128	115-135	115-135	115-135	110-125	110-125
Ultimate elongation	%	D 882	170-160	125-80	125-80	125-80	125-80	125-80	125-80	130-90	130-90	130-90	120-85	122-88
Impact strength	kJ/m2	//	5-4,8	5,0-4,0	5,0-4,0	5,0-4,0	5,0-4,0	5,0-4,0	5,0-4,0	6,5-6,0	6,5-6,0	6,5-6,0	5,5-4,8	5,5-5
Welding strength	N/cm	//	25	30	30	30	30	30	30	32	35	33	30	30
Srinkage at 75°	%	//	24-28	20-22	20-22	20-22	20-22	20-22	20-22	18-20	18-20	18-20	20-22	20-22
Srinkage at 85°	%	//	32-42	30-32	30-32	30-32	30-32	30-32	30-32	28-30	28-30	28-30	28-30	28-30
Srinkage at 95°	%	//	38-48	36-42	36-42	36-42	36-42	36-42	36-42	35-40	35-40	35-40	35-40	35-40
Srinkage strength	MPa	//	5,4-5,9	6,0-6,3	6,0-6,3	6,0-6,3	6,0-6,3	6,0-6,3	6,0-6,3	3,9-4,1	3,9-4,1	3,9-4,1	4,2-4,5	4,1-4,3
Haze	%	D 1006	4,0	1,8	1,8	1,8	1,8	1,8	1,8	2,5	2,8	2,2	2,3	2,3
Gloss	%	D 2534	100	120	120	120	120	120	120	110	110	110	110	110
Oxygen permea bilty at 0% RH	cc/24h*m 2*atm	D 3985	25	25	18	12	25	12	18	25	25	25	8	6
Oxygen permea bilty at 80%	cc/24h*m 2*atm	D 3985	32	40	25	18	35	16	25	35	35	35	12	10
Aqueous steam transmissivity	g/24h*m2	F 385	8	14	14	14	14	14	12	8	8	8	8	8
Curling phoenomenon	//	//	absent	low	absent	low	low	low	absent	absent	absent	absent	low	low

(*) film delamination

Table 3